

RECOMMENDED CUTTING CONDITIONS

■ Dry Cutting

(inch)

|   | Workpiece Material                          | Properties                        | Grade         | vc<br>(SFM)    | fz<br>(IPT)      | ap    | ae     |
|---|---------------------------------------------|-----------------------------------|---------------|----------------|------------------|-------|--------|
| P | Mild Steel                                  | Hardness<br>≤180HB                | MV1020        | 985 (655—1310) | .012 (.008—.016) | ≤.118 | ≤0.8DC |
|   |                                             |                                   | MP6120,VP15TF | 820 (655—985)  | .012 (.008—.016) | ≤.118 | ≤0.8DC |
|   |                                             |                                   | MV1030        | 805 (620—985)  | .012 (.008—.016) | ≤.118 | ≤0.8DC |
|   |                                             |                                   | MP6130        | 785 (620—950)  | .012 (.008—.016) | ≤.118 | ≤0.8DC |
|   | Carbon Steel,Alloy Steel                    | Hardness<br>180-280HB             | MV1020        | 850 (560—1150) | .012 (.008—.016) | ≤.118 | ≤0.8DC |
|   |                                             |                                   | MP6120,VP15TF | 720 (560—885)  | .012 (.008—.016) | ≤.118 | ≤0.8DC |
|   |                                             |                                   | MV1030        | 690 (490—885)  | .012 (.008—.016) | ≤.118 | ≤0.8DC |
|   |                                             |                                   | MP6130        | 655 (490—820)  | .012 (.008—.016) | ≤.118 | ≤0.8DC |
|   | Carbon Steel,Alloy Steel                    | Hardness<br>280—350HB             | MV1020        | 590 (330—820)  | .012 (.008—.016) | ≤.118 | ≤0.8DC |
|   |                                             |                                   | MP6120,VP15TF | 460 (330—590)  | .012 (.008—.016) | ≤.118 | ≤0.8DC |
|   |                                             |                                   | MV1030        | 440 (295—590)  | .012 (.008—.016) | ≤.118 | ≤0.8DC |
|   |                                             |                                   | MP6130        | 395 (295—490)  | .012 (.008—.016) | ≤.118 | ≤0.8DC |
|   | Alloy Tool Steel                            | Hardness<br>≤350HB<br>(annealing) | MP6120,VP15TF | 460 (330—590)  | .006 (.004—.008) | ≤.039 | ≤0.8DC |
|   |                                             |                                   | MP6130        | 395 (295—490)  | .006 (.004—.008) | ≤.039 | ≤0.8DC |
|   | Pre-hardened Steel                          | Hardness<br>35—45HRC              | MP6120        | 460 (330—590)  | .006 (.004—.008) | ≤.039 | ≤0.8DC |
|   |                                             |                                   | MP6130        | 395 (295—490)  | .006 (.004—.008) | ≤.039 | ≤0.8DC |
| M | Austenitic Stainless Steel                  | Hardness<br>≤200HB                | MP7130,VP15TF | 655 (490—820)  | .008 (.004—.012) | ≤.118 | ≤0.8DC |
|   |                                             |                                   | MV1030        | 605 (395—820)  | .008 (.004—.012) | ≤.118 | ≤0.8DC |
|   |                                             |                                   | MP7140        | 590 (395—755)  | .008 (.004—.012) | ≤.118 | ≤0.8DC |
|   |                                             | Hardness<br>> 200HB               | MP7130,VP15TF | 490 (330—655)  | .008 (.004—.012) | ≤.118 | ≤0.8DC |
|   |                                             |                                   | MV1030        | 460 (260—655)  | .008 (.004—.012) | ≤.118 | ≤0.8DC |
|   |                                             |                                   | MP7140        | 425 (260—590)  | .008 (.004—.012) | ≤.118 | ≤0.8DC |
|   | Ferritic and Martensitic<br>Stainless Steel | Hardness<br>≤200HB                | MP7130,VP15TF | 655 (490—820)  | .008 (.004—.012) | ≤.118 | ≤0.8DC |
|   |                                             |                                   | MV1030        | 605 (395—820)  | .008 (.004—.012) | ≤.118 | ≤0.8DC |
|   |                                             |                                   | MP7140        | 590 (395—755)  | .008 (.004—.012) | ≤.118 | ≤0.8DC |
|   |                                             | Hardness<br>> 200HB               | MP7130,VP15TF | 490 (330—655)  | .008 (.004—.012) | ≤.118 | ≤0.8DC |
|   |                                             |                                   | MV1030        | 460 (260—655)  | .008 (.004—.012) | ≤.118 | ≤0.8DC |
|   |                                             |                                   | MP7140        | 425 (260—590)  | .008 (.004—.012) | ≤.118 | ≤0.8DC |
|   | Two-Phase Stainless Steel                   | Hardness<br>≤280HB                | MP7130,VP15TF | 460 (330—590)  | .006 (.002—.010) | ≤.118 | ≤0.8DC |
|   |                                             |                                   | MP7140        | 395 (260—525)  | .006 (.002—.010) | ≤.118 | ≤0.8DC |
|   | Precipitation-Hardened<br>Stainless Steel   | Hardness<br>< 450HB               | MP7130,VP15TF | 425 (330—525)  | .006 (.002—.010) | ≤.118 | ≤0.8DC |
|   |                                             |                                   | MP7140        | 360 (260—460)  | .006 (.002—.010) | ≤.118 | ≤0.8DC |
| K | Gray Cast Iron                              | Tensile Strength<br>≤350MPa       | MC5020        | 720 (490—985)  | .012 (.008—.016) | ≤.118 | ≤0.8DC |
|   |                                             |                                   | VP15TF        | 590 (425—755)  | .012 (.008—.016) | ≤.118 | ≤0.8DC |
|   | Ductile Cast Iron                           | Tensile Strength<br>≤450MPa       | MV1020        | 785 (425—1150) | .008 (.004—.012) | ≤.118 | ≤0.8DC |
|   |                                             |                                   | MC5020        | 720 (490—985)  | .008 (.004—.012) | ≤.118 | ≤0.8DC |
|   |                                             |                                   | MV1030        | 605 (395—820)  | .008 (.004—.012) | ≤.118 | ≤0.8DC |
|   |                                             |                                   | VP15TF        | 560 (395—720)  | .008 (.004—.012) | ≤.118 | ≤0.8DC |
|   | Ductile Cast Iron                           | Tensile Strength<br>≤800MPa       | MV1020        | 720 (260—1150) | .008 (.004—.012) | ≤.118 | ≤0.8DC |
|   |                                             |                                   | MC5020        | 560 (490—655)  | .008 (.004—.012) | ≤.118 | ≤0.8DC |
|   |                                             |                                   | MV1030        | 490 (330—655)  | .008 (.004—.012) | ≤.118 | ≤0.8DC |
|   |                                             |                                   | VP15TF        | 460 (330—590)  | .008 (.004—.012) | ≤.118 | ≤0.8DC |
| H | Hardened Steel                              | Hardness<br>40—55HRC              | VP15TF        | 260 (195—330)  | .006 (.004—.008) | ≤.039 | ≤0.8DC |

■ Wet Cutting

(inch)

|   | Workpiece Material                          | Properties          | Grade         | vc<br>(SFM)   | fz<br>(IPT)      | ap    | ae     |
|---|---------------------------------------------|---------------------|---------------|---------------|------------------|-------|--------|
| M | Austenitic Stainless Steel                  | Hardness<br>≤200HB  | MP7130,VP15TF | 410 (330—490) | .006 (.004—.008) | ≤.118 | ≤0.8DC |
|   |                                             |                     | MP7140        | 330 (260—460) | .006 (.004—.008) | ≤.118 | ≤0.8DC |
|   |                                             | Hardness<br>> 200HB | MP7130,VP15TF | 330 (245—410) | .006 (.004—.008) | ≤.118 | ≤0.8DC |
|   |                                             |                     | MP7140        | 260 (180—345) | .006 (.004—.008) | ≤.118 | ≤0.8DC |
|   | Ferritic and Martensitic<br>Stainless Steel | Hardness<br>≤200HB  | MP7130,VP15TF | 410 (330—490) | .006 (.004—.008) | ≤.118 | ≤0.8DC |
|   |                                             |                     | MP7140        | 330 (260—460) | .006 (.004—.008) | ≤.118 | ≤0.8DC |
|   |                                             | Hardness<br>> 200HB | MP7130,VP15TF | 330 (245—410) | .006 (.004—.008) | ≤.118 | ≤0.8DC |
|   |                                             |                     | MP7140        | 260 (180—345) | .006 (.004—.008) | ≤.118 | ≤0.8DC |
|   | Two-Phase Stainless Steel                   | Hardness<br>≤280HB  | MP7130,VP15TF | 260 (195—330) | .004 (.002—.006) | ≤.118 | ≤0.8DC |
|   |                                             |                     | MP7140        | 195 (130—260) | .004 (.002—.006) | ≤.118 | ≤0.8DC |
|   | Precipitation-Hardening<br>Stainless Steel  | Hardness<br>< 450HB | MP7130,VP15TF | 230 (165—295) | .004 (.002—.006) | ≤.118 | ≤0.8DC |
|   |                                             |                     | MP7140        | 165 (100—230) | .004 (.002—.006) | ≤.118 | ≤0.8DC |

■ Cutting Conditions with Wiper Insert

(inch)

|   | Workpiece Material                          | Properties                  | Grade         | vc<br>(SFM)     | fz<br>(IPT)      | ap    |
|---|---------------------------------------------|-----------------------------|---------------|-----------------|------------------|-------|
| P | Mild Steel                                  | ≤180HB                      | MP6120,VP15TF | 820 (655—985)   | .012 (.008—.016) | ≤.020 |
|   | Carbon Steel,Alloy Steel                    | 180—280HB                   | MP6120,VP15TF | 720 (560—885)   | .012 (.008—.016) | ≤.020 |
|   |                                             | 280—350HB                   | MP6120,VP15TF | 460 (330—590)   | .012 (.008—.016) | ≤.020 |
|   | Alloy Tool Steel                            | ≤350HB<br>(Annealing)       | MP6120,VP15TF | 460 (330—590)   | .006 (.004—.008) | ≤.020 |
|   | Pre-hardened Steel                          | 35—45HRC                    | MP6120,VP15TF | 460 (330—590)   | .006 (.004—.008) | ≤.020 |
| M | Austenitic Stainless Steel                  | ≤200HB                      | VP15TF        | 410 (330—490)   | .006 (.004—.008) | ≤.020 |
|   |                                             | > 200HB                     | VP15TF        | 330 (245—410)   | .006 (.004—.008) | ≤.020 |
|   | Ferritic and Martensitic<br>Stainless Steel | ≤200HB                      | VP15TF        | 410 (330—490)   | .006 (.004—.008) | ≤.020 |
|   |                                             | > 200HB                     | VP15TF        | 330 (245—410)   | .006 (.004—.008) | ≤.020 |
|   | Two-phase Stainless Steel                   | ≤280HB                      | VP15TF        | 260 (195—330)   | .004 (.002—.006) | ≤.020 |
|   | Precipitation Hardening<br>Stainless Steel  | < 450HB                     | VP15TF        | 230 (165—295)   | .004 (.002—.006) | ≤.020 |
| K | Gray Cast Iron                              | Tensile Strength<br>≤350MPa | MC5020        | 1050 (820—1310) | .012 (.008—.016) | ≤.020 |
|   |                                             |                             | VP15TF        | 720 (490—985)   | .012 (.008—.016) | ≤.020 |
|   | Ductile Cast Iron                           | Tensile Strength<br>≤450MPa | MC5020        | 820 (655—985)   | .008 (.004—.012) | ≤.020 |
|   |                                             |                             | VP15TF        | 655 (490—820)   | .008 (.004—.012) | ≤.020 |
|   |                                             | Tensile Strength<br>≤800MPa | MC5020        | 720 (655—820)   | .008 (.004—.012) | ≤.020 |
| H | Hardened Steel                              | 40—55HRC                    | VP15TF        | 260 (195—330)   | .006 (.004—.008) | ≤.020 |

Note 1) Refer to the above table and set up cutting conditions according to cutting applications.  
Note 2) When placing emphasis on surface finish quality, wet cutting is recommended. (Tool life is lowered when compared to dry cutting)  
Note 3) The recommended depth of cut differs according to insert geometry.  
Note 4) When clamp rigidity is low and tool overhang is long, we recommended to reduce the cutting speed and the feed rate by 30%.  
Note 5) Recommended wet cutting for good surface finishing of stainless steel. (Tool life is short compared to dry cutting.)

## Recommended Cutting Conditions

### ■ AHX440S

#### Dry Cutting

(inch)

|          | Workpiece Material          | Properties                  | Cutting Speed <b>vc</b> (SFM) |               | Feed<br><b>fz</b> (IPT) | Depth of Cut<br><b>ap</b> | Width of Cut<br><b>ae</b> |
|----------|-----------------------------|-----------------------------|-------------------------------|---------------|-------------------------|---------------------------|---------------------------|
|          |                             |                             | <b>MV1020</b>                 | <b>MV1030</b> |                         |                           |                           |
| <b>P</b> | Mild Steel                  | Hardness<br>≤180HB          | 985(655—1310)                 | 805(620—985)  | .012(.008—.016)         | ≤.118                     | ≤0.8DC                    |
|          | Carbon Steel<br>Alloy Steel | Hardness<br>180—280HB       | 850(560—1150)                 | 690(490—885)  | .012(.008—.016)         | ≤.118                     | ≤0.8DC                    |
|          | Carbon Steel<br>Alloy Steel | Hardness<br>280—350HB       | 590(330—820)                  | 490(295—590)  | .012(.008—.016)         | ≤.118                     | ≤0.8DC                    |
| <b>M</b> | Stainless Steel             | Hardness<br>≤200HB          | —                             | 605(395—820)  | .008(.004—.012)         | ≤.118                     | ≤0.8DC                    |
|          |                             | Hardness<br>>200HB          | —                             | 460(260—655)  | .008(.004—.012)         | ≤.118                     | ≤0.8DC                    |
| <b>K</b> | Ductile Cast Iron           | Tensile Strength<br>≤450MPa | 785(425—1150)                 | 605(395—820)  | .008(.004—.012)         | ≤.118                     | ≤0.8DC                    |
|          |                             | Tensile Strength<br>≤800MPa | 720(260—1150)                 | 490(330—655)  | .008(.004—.012)         | ≤.118                     | ≤0.8DC                    |

(Note 1) Refer to the above table and set up cutting conditions according to cutting applications.

(Note 2) When placing emphasis on surface finish quality, wet cutting is recommended. (Tool life is lowered as compared to dry cutting)

(Note 3) The recommended depth of cut differs according to insert geometry.

(Note 4) When clamp rigidity is low and tool overhang is long, we recommended to reduce the cutting speed and the feed rate by 30%.

(Note 5) Recommended wet cutting for good surface finishing of stainless steel. (Tool life is short compared to wet cutting.)